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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,223	11/21/2003	Yoshio Usui	H0005110G-1050	3179

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Honeywell International, Inc.
Law Dept. AB2
P.O. Box 2245
Morristown, NJ 07962-9806

EXAMINER

PICKARD, ALISON K

ART UNIT	PAPER NUMBER
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3676

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/719,223	Applicant(s) USUI ET AL.	
	Examiner Alison K. Pickard	Art Unit 3676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claim 14 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. This claim appears to have only limitations already required by claim 1.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 9-28, 31-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harvey (4,592,559) in view of Mader (5,380,018).

Harvey discloses a piston ring in a piston of a gas compressor. The ring has a top, bottom, inside surface, and outside surface as seen in Figure 4. The height of the ring is about 4.5 to 6.4 times larger than the thickness (see col. 4, lines 22-23). The ring has a plurality of recesses (e.g. 26, 28, 20, 22) formed in the surfaces. As seen in Figure 2, ring 14 has a gap extending through it. Harvey states the gap can be any suitable joint construction (col. 2, lines 58-61), but does not appear to give any dimensions of the gap. Mader teaches a piston ring with a gap. Mader teaches forming the gap wider before installation (3a versus 3b). This construction provides increased pressure at the ends and improved sealing in both warm and cold engine

Art Unit: 3676

conditions. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the ring of Harvey with the teaching of Mader to improve sealing ability during varied engine temperatures.

Regarding claims 1, 13, 14, 18-21, 24, 27, 28, and 41 Mader does not, however, relate the size of the gap to the thickness of the ring. It is not considered inventive to discover the optimum or workable ranges by routine experimentation absent some showing of criticality. See *In re Aller*, 105 USPQ 233, 235 (CCPA 1955). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the gap with about $\frac{1}{4}$ to 2 times greater than the thickness.

Regarding claims 9-12, 15, 16, 22, 23, 31-36, 39, and 40, the ring inherently has a roughness, hardness, thickness, and an edge with an arc with a radius, however Harvey does not appear to disclose the ranges required by these claims. Again, it is not considered inventive to discover the optimum or workable ranges by routine experimentation absent some showing of criticality. See *In re Aller*, 105 USPQ 233, 235 (CCPA 1955). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the ring with these dimensions.

4. Claims 2-8, 29, 30, and 42-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harvey in view of Mader in view of Schall (2005/0006006)

Harvey discloses a piston ring in a piston of a gas compressor. The ring has a top, bottom, inside surface, and outside surface as seen in Figure 4. The height of the ring is about 4.5 to 6.4 times larger than the thickness (see col. 4, lines 22-23). The ring has a plurality of recesses (e.g. 26, 28, 20, 22) formed in the surfaces. As seen in Figure 2, ring 14 has a gap

Art Unit: 3676

extending through it. Harvey states the gap can be any suitable joint construction (col. 2, lines 58-61), but does not appear to give any dimensions of the gap. Mader teaches a piston ring with a gap. Mader teaches forming the gap wider before installation (3a versus 3b). This construction provides increased pressure at the ends and improved sealing in both warm and cold engine conditions. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the ring of Harvey with the teaching of Mader to improve sealing ability during varied engine temperatures.

Mader does not, however, relate the size of the gap to the thickness of the ring. It is not considered inventive to discover the optimum or workable ranges by routine experimentation absent some showing of criticality. See *In re Aller*, 105 USPQ 233, 235 (CCPA 1955).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the gap with about $\frac{1}{4}$ to 2 times greater than the thickness.

Harvey does not disclose the ring is made of a material comprising cobalt, chromium, tungsten, and carbon. Schall teaches an improved material suitable for use in high temperature applications. The material comprises cobalt, chromium, tungsten, carbon, and more. All but cobalt and iron are within the claimed ranges. However, it is not considered inventive to discover the optimum or workable ranges by routine experimentation absent some showing of criticality. See *In re Aller*, 105 USPQ 233, 235 (CCPA 1955). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the material taught by Schall so the piston ring can withstand high temperatures stresses and to use the claimed ranges.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alison K. Pickard whose telephone number is 571-272-7062. The examiner can normally be reached on M-F (9-5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Gay can be reached on 571-272-7029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alison K. Pickard/
Primary Examiner, Art Unit 3676

AP